



Armed Forces College of Medicine AFCM







DISEASES OF ENDOCRINE GLANDS

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DISEASES OF THYROID GLAND



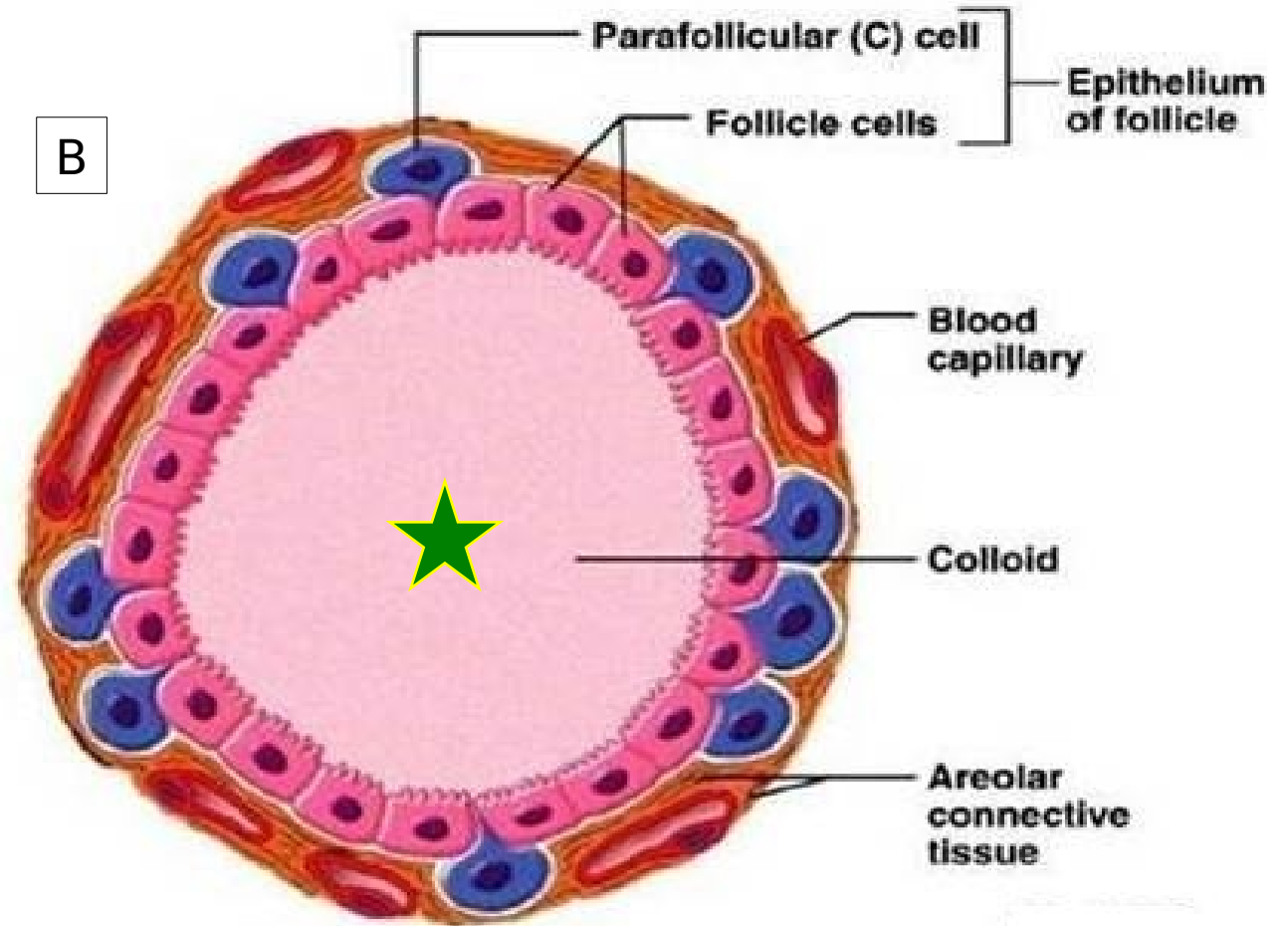
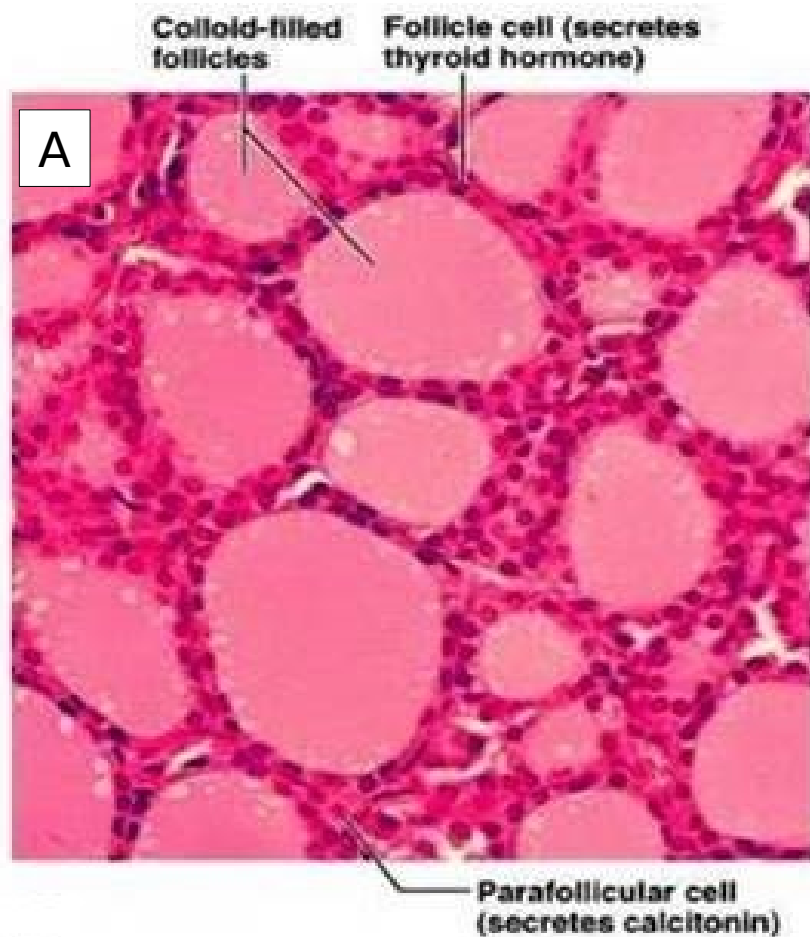
INTENDED LEARNING OBJECTIVES (ILO)



By the end of this lecture the student will be able to:

1. Describe the pathological features of different types of thyroiditis and their complications.
2. Discuss the pathogenesis and pathological features of different types of goitre
3. Compare between thyroid tumours regarding their pathological features , complications, methods of spread and prognosis.

Histology of thyroid gland





Thyroiditis: Inflammation of the thyroid gland

1. Hashimoto's thyroiditis

2. Subacute thyroiditis

(= de Quervain thyroiditis or granulomatous thyroiditis)_

3. Riedel's thyroiditis



Hashimoto's thyroiditis-1



Aetiology: Autoimmune disease

Pathogenesis: Immune destruction of thyroid

N.B:

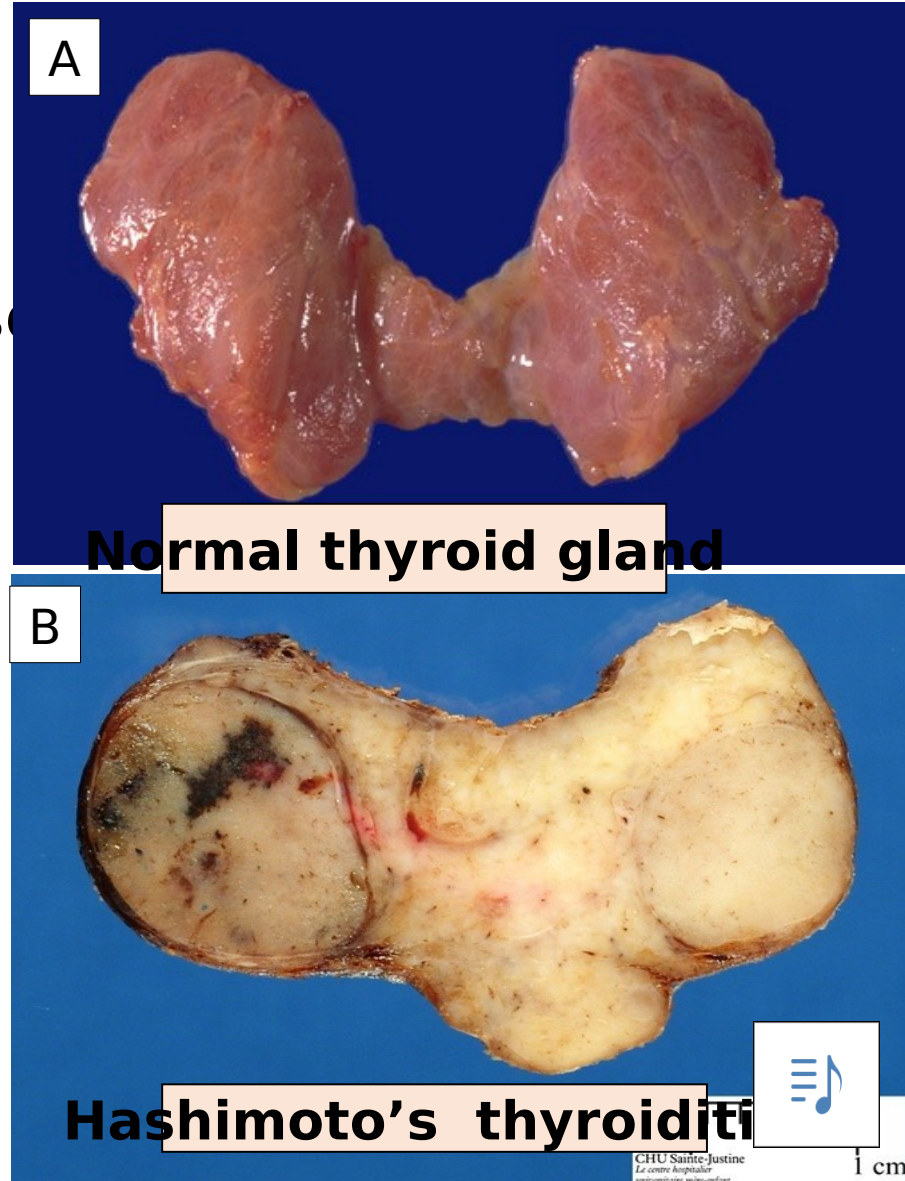
may be associated with other autoimmune diseases
systemic lupus erythematosus, rheumatoid arthritis

Sex & age:

Females > males, with peak age 40–65.

Gross: Thyroid gland is

- ☐ Enlarged
- ☐ Firm & Rubbery
- ☐ Greyish white.



Hashimoto's thyroiditis-1

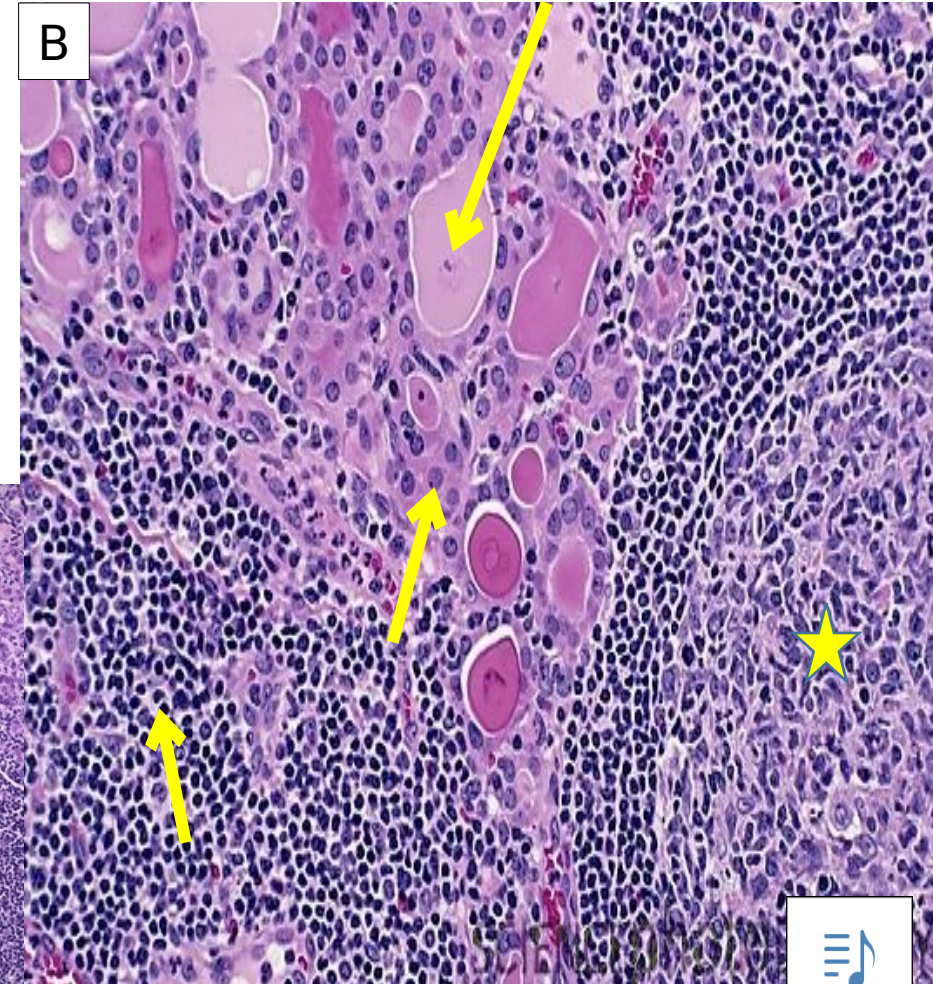
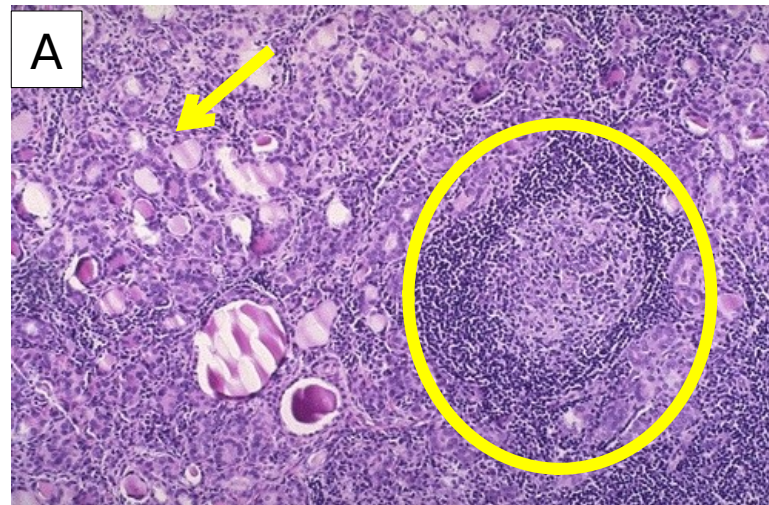


Mic: Thyroid gland shows

- ❑ Atrophic thyroid follicles
- ❑ Residual follicular cells are transformed into large pink cells (**Askanazy or Hurthle cells**)
- ❑ Extensive replacement by lymphocytes → **so greyish white grossly**
- ❑ Lymphoid follicles with prominent germinal centers.

Complications

- ❑ Hypothyroidism
- ❑ Papillary carcinoma of thyroid
- ❑ Non-Hodgkin B-cell lymphoma



Subacute thyroiditis-2



(= de Quervain thyroiditis or granulomatous thyroiditis)

Self limited disease

Etiology:

It is often preceded by an upper respiratory tract infection, suggesting the possibility of **viral origin.**

Sex&Age

Females > males, with peak age 30-50.

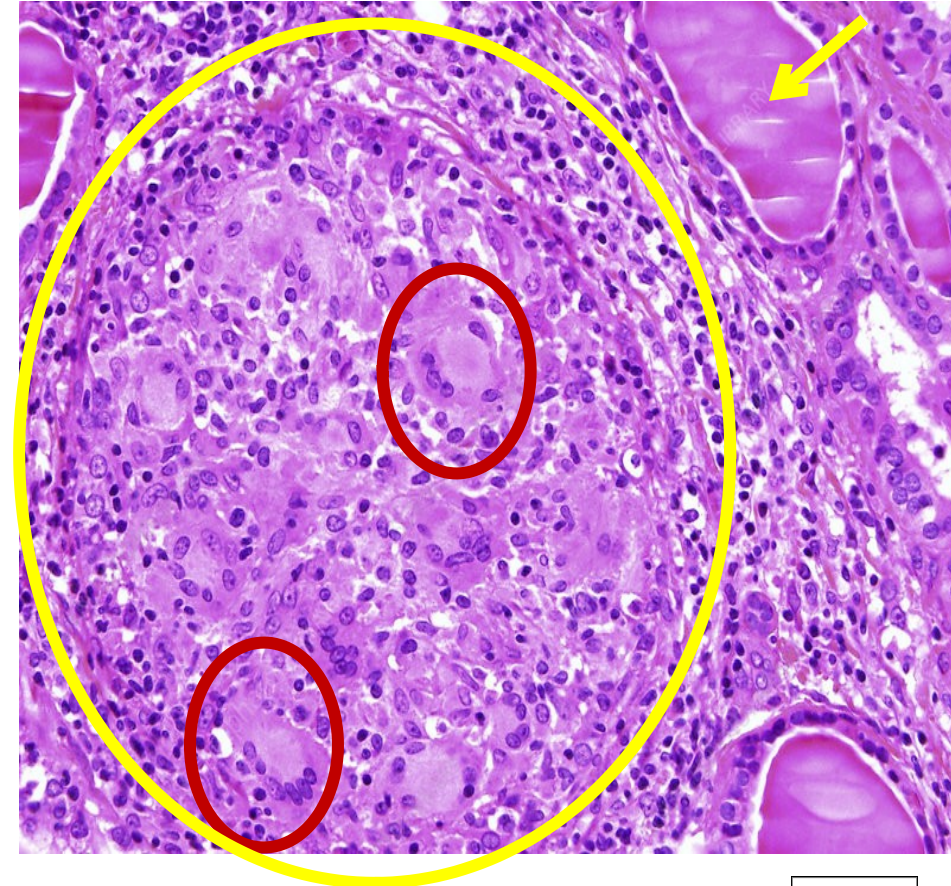
Gross: thyroid gland

☐ Enlarged

☐ Firm

Mic:

Infiltration by lymphocytes, plasma cells, histiocytes foreign body giant cells with **granuloma formation.**



Riedle's thyroiditis-3



Aetiology: Idiopathic

Sex & Age:

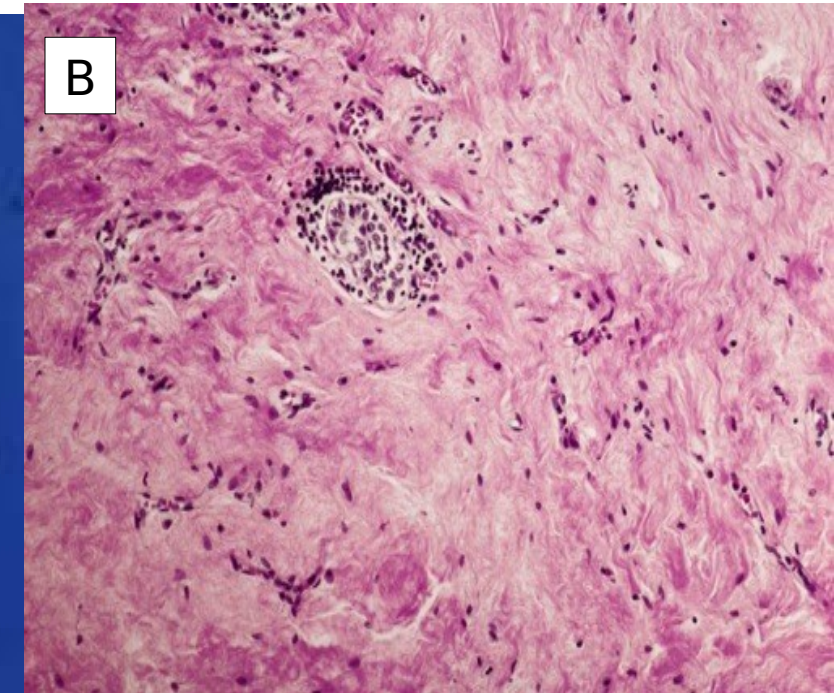
- ☐ Females > males,
- ☐ Middle-aged.

Gross : Thyroid gland:

- ☐ Enlarged
- ☐ Stony hard
- ☐ Greyish white
- ☐ Adherent to adjacent tissues

Mic:

- ☐ Dense fibrosis replacing thyroid tissue.
- ☐ Patchy chronic inflammation



Complications

- ☐ Hypothyroidism
- ☐ Pressure symptoms



Goiter



Definition

Non inflammatory **non** neoplastic enlargement of the thyroid gland.

**1-Simple
(non toxic)
goiter**

**2-Toxic
goiter**



Simple Goiter



Definition

Goiter which is **unaccompanied** by thyroid hyper function (non toxic)

Aetiology and pathogeneses

Iodine deficiency (absolute or relative)

- ▶ decreased in out put of thyroid hormone in blood
- ▶ rise in pituitary TSH
- ▶ hypertrophy and hyperplasia of thyroid follicular cells
- ▶ thyroid enlargement and rise of hormone output



Simple Goiter-1



**1-Simple
Diffuse
goiter**

then becomes

**2-Simple
Nodular
goiter**

Symmetrical enlargement



Asymmetrical enlargement

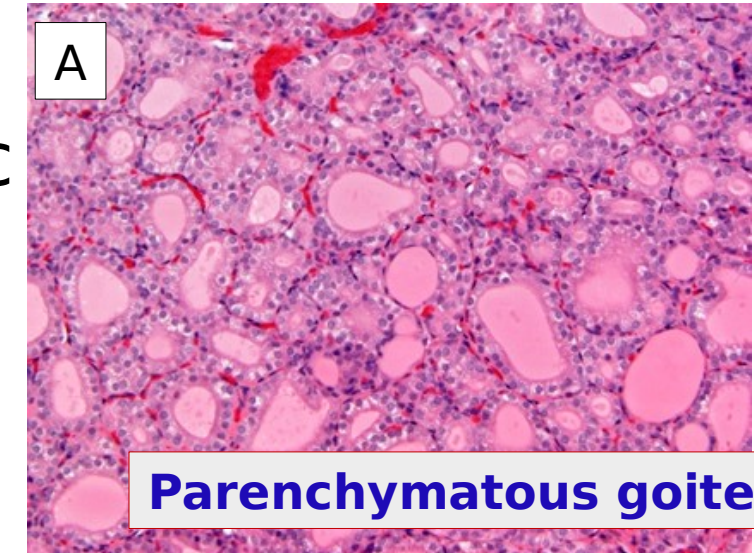


A- Simple Diffuse Goiter



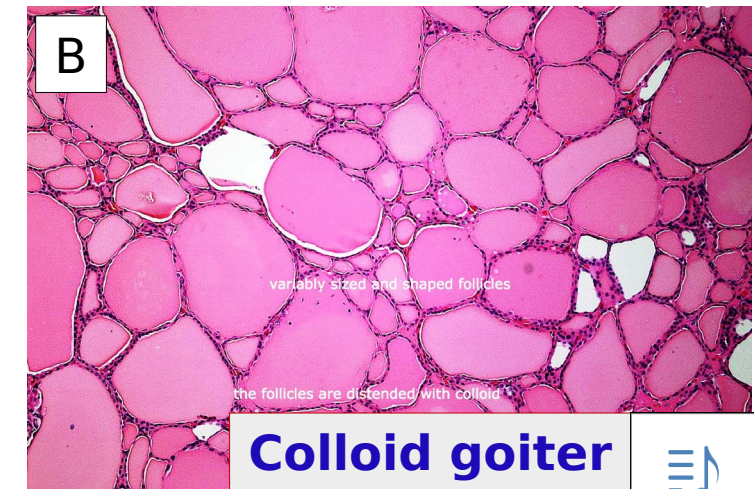
A-Diffuse parenchymatous goiter

- ❑ **Early** in the disease when **iodine** supply is **inadequate** → increase TSH → hypertrophic and hyperplastic gland.
- ❑ Thyroid follicles contain little colloid.



B-Diffuse colloid goiter:

- ❑ If dietary iodine ↑, or ↓ demands for thyroid hormone → Involution of follicular epithelium → colloid rich gland.
- ❑ Thyroid follicles are distended with colloid.



B- Simple Nodular Goiter



Aetiology and pathogenesis:

Repeated episodes of iodine deficiency (stimulation)
& iodine correction (involution)



Irregular enlargement of
thyroid gland



Simple nodular goiter

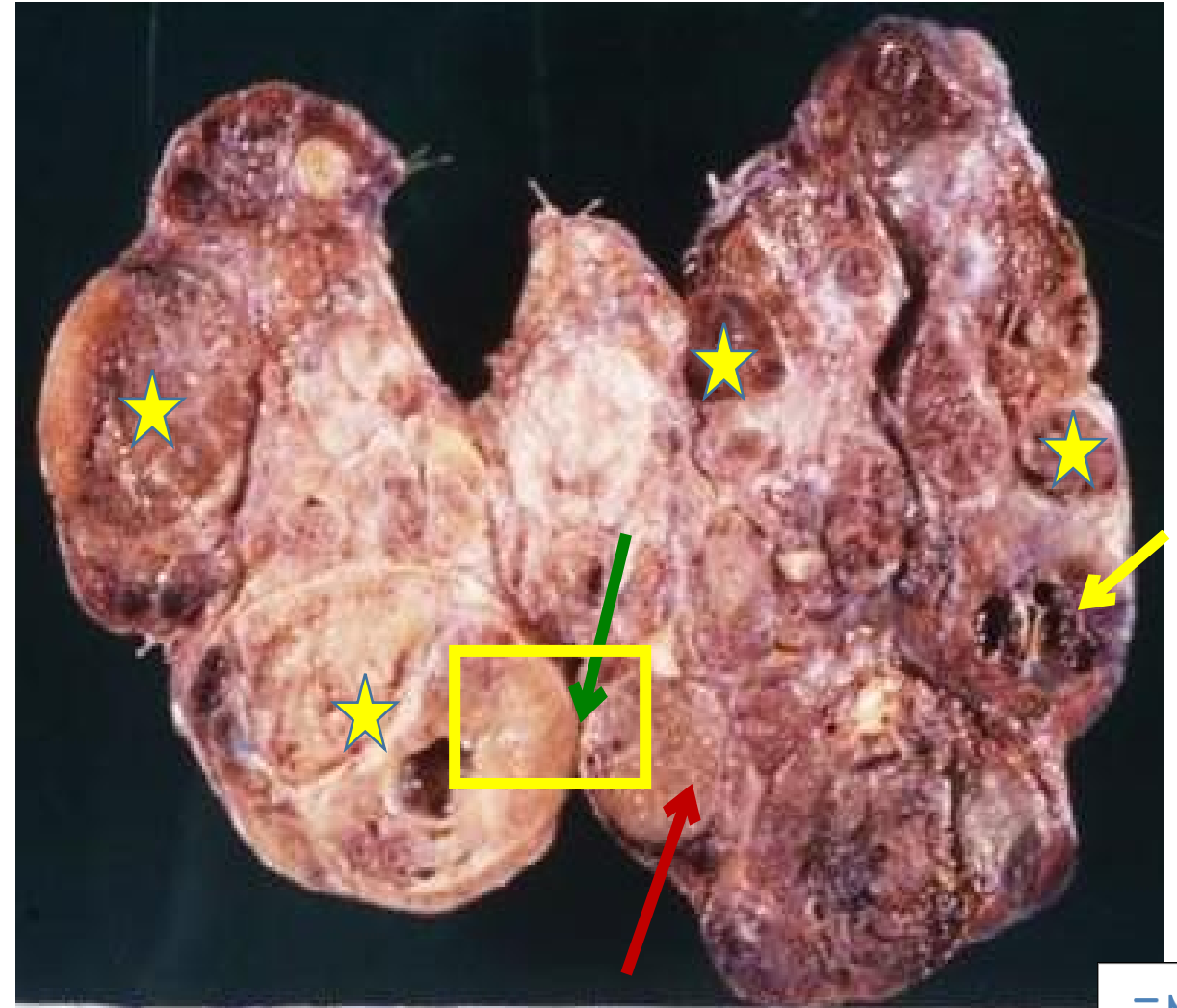


B- Simple Nodular Goiter



Gross: Thyroid gland shows

- Asymmetrical enlargement
- Multinodular outer surface and cut section.
- The nodules are
 - ❑ variably sized
 - ❑ separated by fibrous septae
 - ❑ some solid, others cystic
 - ❑ Filled with glistening brown colloid



B- Simple Nodular Goiter



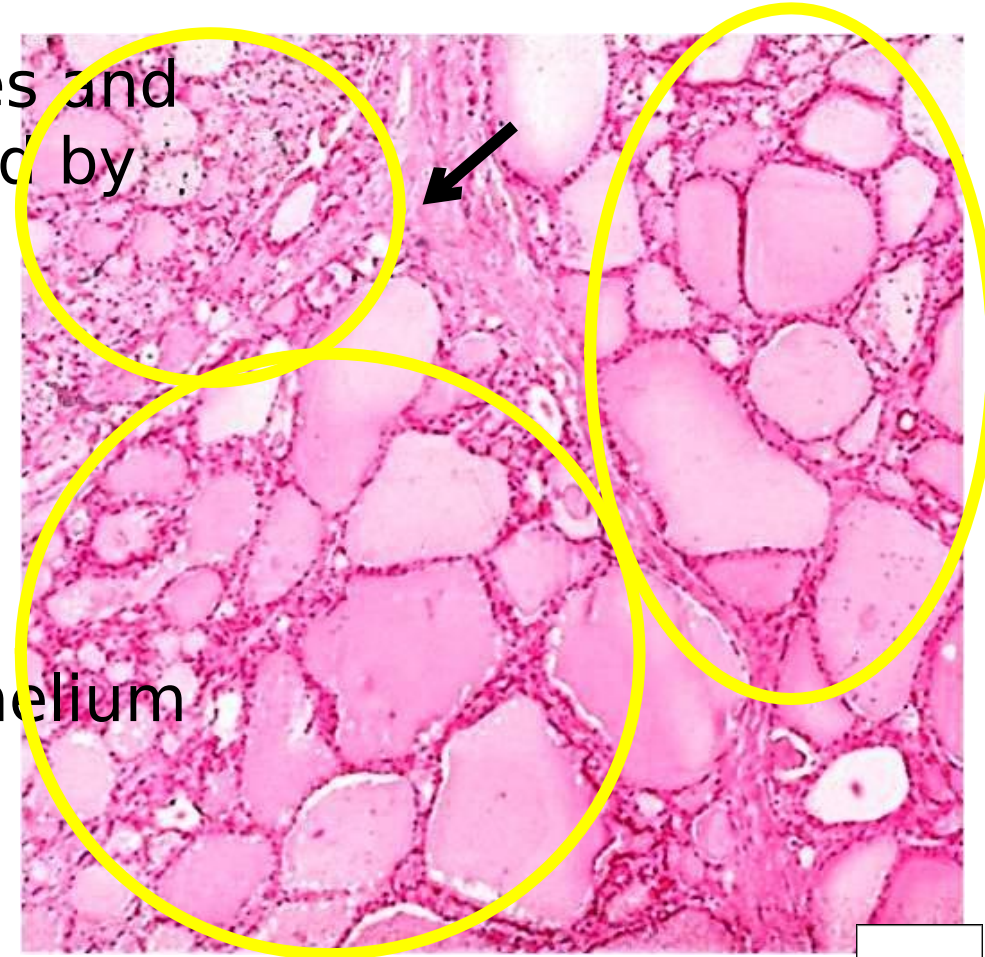
Mic:

❑ **Multiple nodules** formed of thyroid follicles and separated by delicate fibrous tissue infiltrated by lymphocytes.

❑ **Thyroid follicles:**

- Some appear normal
- others are hyperplastic with cuboidal epithelium
- or colloid distended with flattened epithelium

❑ Hemorrhages, calcifications are common



B- Simple Nodular Goiter



N.B:

It is frequently asymptomatic, and the patient is typically euthyroid, with normal T4, T3, and TSH.

Complications

1-Pressure effects

2-Toxic nodular goiter late in the course (**Plummer Syndrome**).



Toxic Goiter -2



2-Toxic Goiter (Thyrotoxicosis)

Primary

(Graves' disease)
Autoimmune
disease
Diffuse

Secondary

(2ry to simple
nodular goiter)
**Nodular
enlargement**



Graves' disease



Graves' disease (1ry hyperthyroidism)
(Diffuse toxic goiter or Exophthalmic goiter)

Pathogenesis

- ❑ Is an autoimmune disease
- ❑ Caused by group of autoantibodies

1-Thyroid stimulating immunoglobulins (TSI): **most important**
(act on TSH receptors mimicking the action of TSH) bind to the thyroid follicle cells and stimulate the gland to secrete T3 and T4. The rise in thyroid hormone concentration will suppress TSH secretion.

2-Thyroid growth-stimulating immunoglobulins.

Also directed against the TSH receptor,
Causing proliferation of thyroid follicular epithelium.

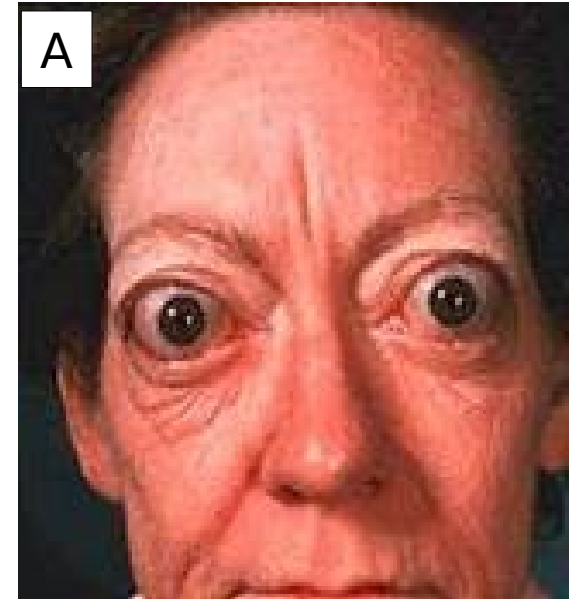


Graves' disease



Clinical manifestations

1. Exophthalmos
2. Weight loss and diarrhea
3. Nervousness ,
insomnia ,tremors
4. Tachycardia, increase blood
pressure & heart failure.
5. Pretibial myxoedema



Pretibial Myxoedema
Patches due to
mucopolysaccharide
accumulation





Exophthalmos:

= Increased Volume of the retro-orbital connective tissues & extra-ocular muscles is due to

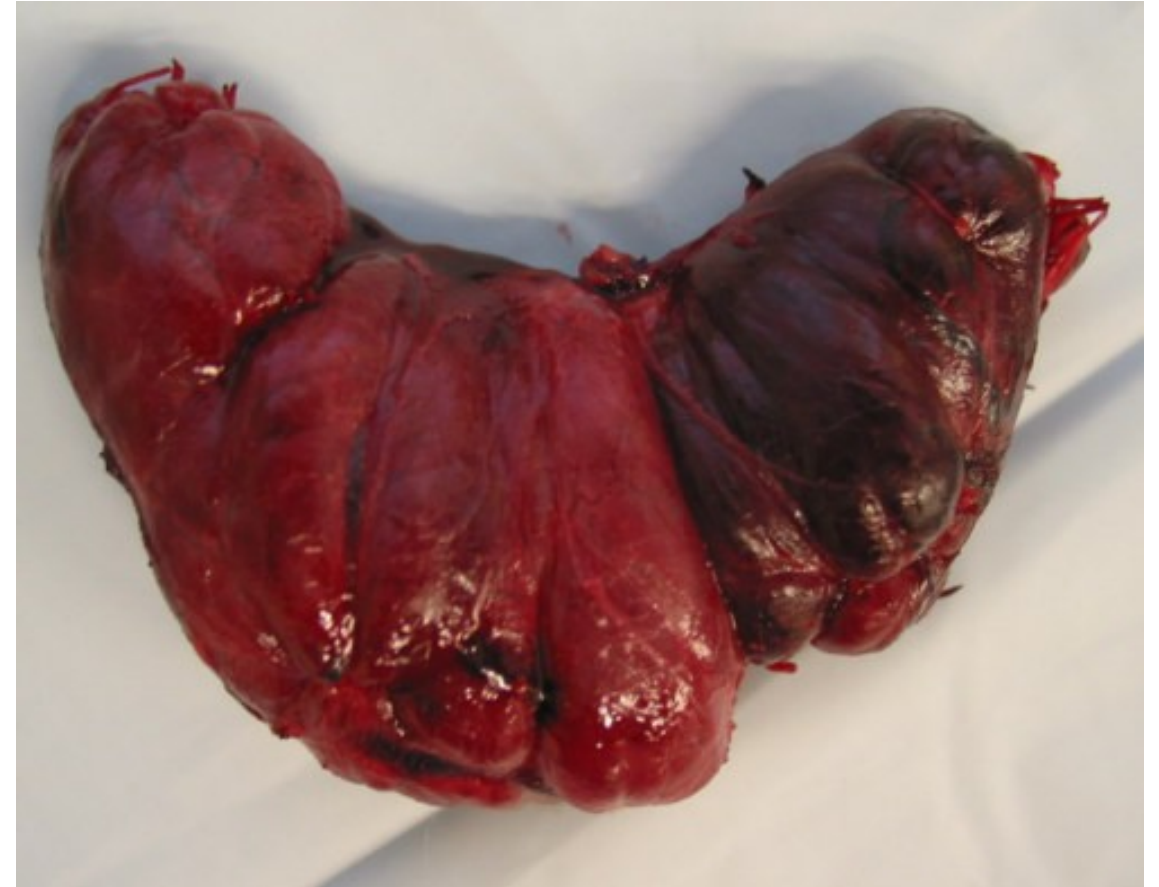
- ☐ Marked infiltration of retro-orbital space by **T lymphocytes**
- ☐ Inflammatory **edema** of extraocular muscles; that undergo **fibrosis** later on
- ☐ Accumulation of **extracellular matrix** components
- ☐ Increased numbers of adipocytes (**fatty infiltration**).

Graves' disease



Gross

- ❑ Moderate diffuse symmetrical thyroid enlargement
- ❑ Cut section is pink due to high vascularity



Graves' disease



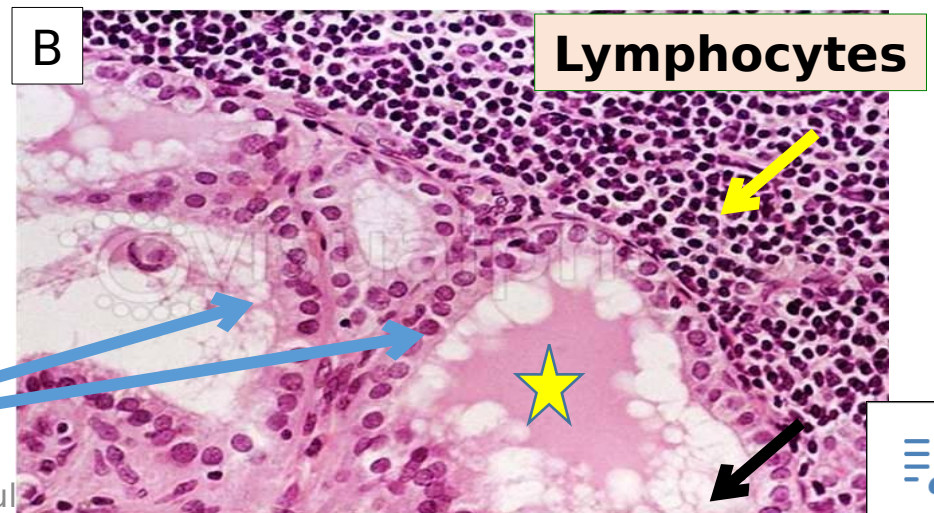
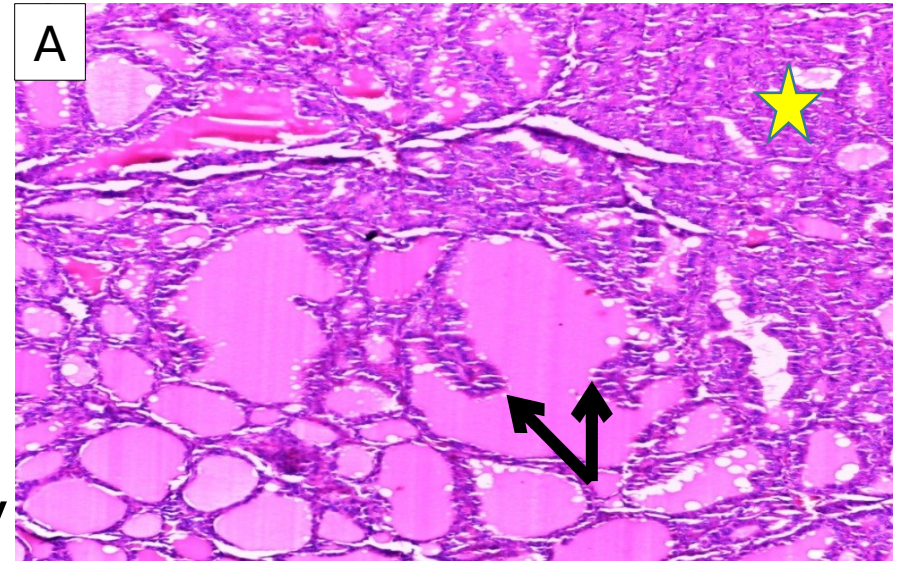
Mic:

Thyroid follicles

- ❑ Hyperplastic
- ❑ lined by columnar cells with frequent papillary formation
- ❑ The colloid is scanty which is peripherally scalloped (vacuolated) due to rapid absorption of thyroid hormones

Thyroid stroma shows

- ❑ Lymphocytic infiltration
- ❑ High vascularity



Columnar cells

Lymphocytes



Benign tumours (Adenoma)



Adenoma

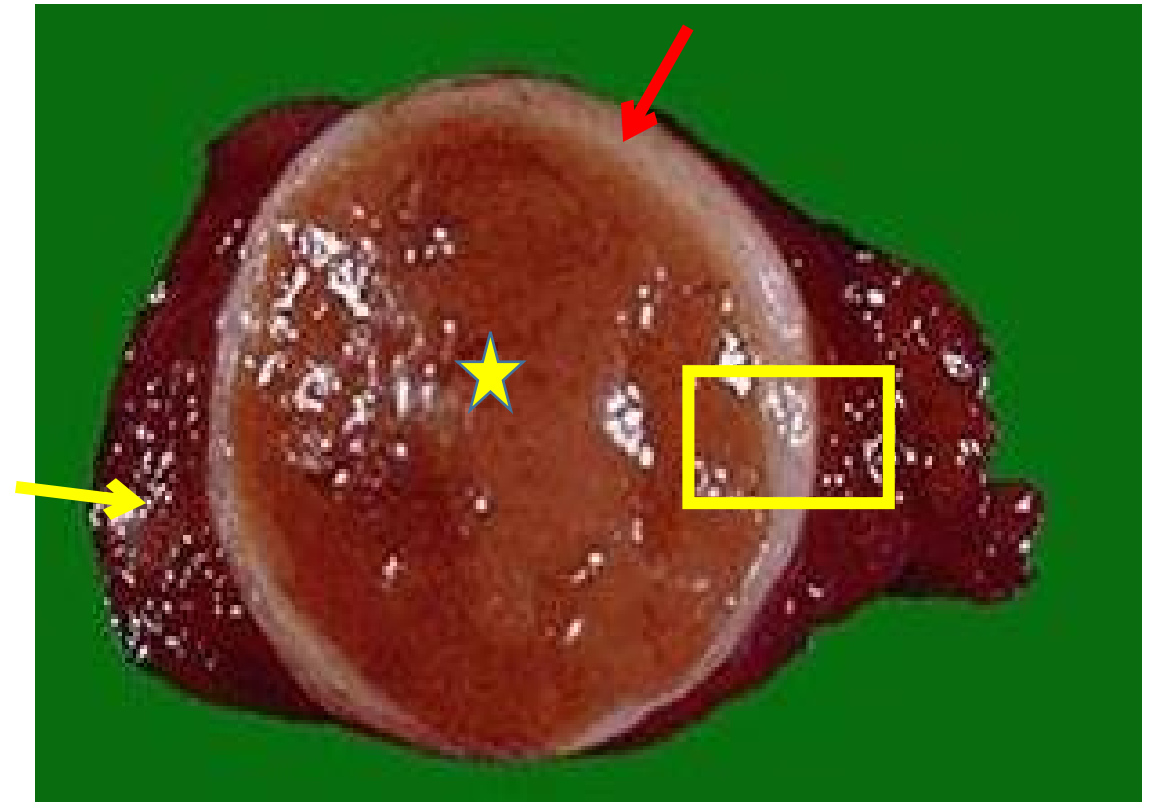
Derived from follicular epithelium

Complications

- ☐ Pressure effects
- ☐ Toxic adenoma
- ☐ Malignancy

Gross

- ☐ A solitary round encapsulated nodule
- ☐ Cut section is fleshy translucent brown



Benign tumours (Adenoma)

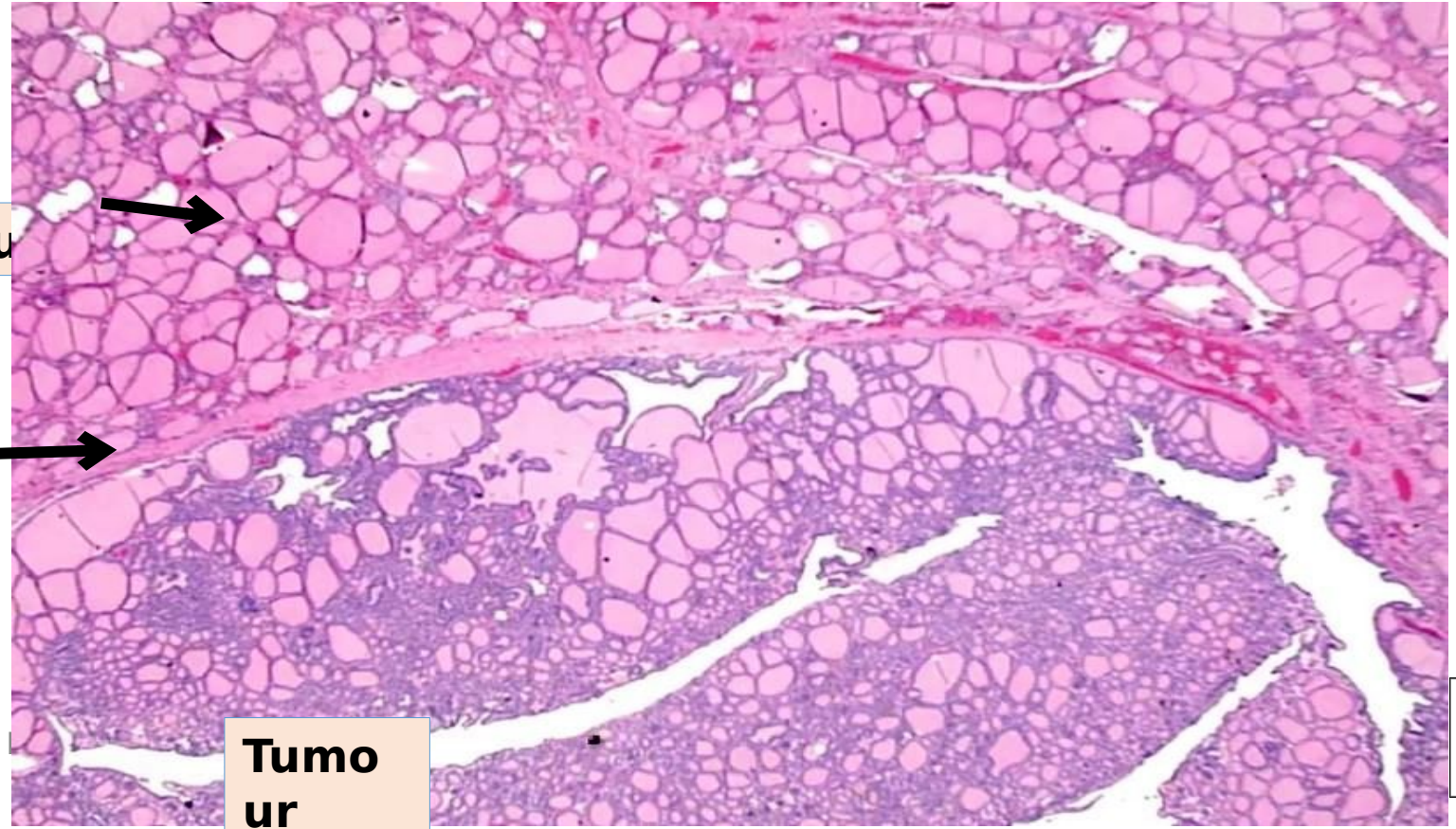


Mic

- ❑ The tumour is capsulated
- ❑ It is surrounded by compressed normal thyroid follicles

Normal thyroid tissue

Fibrous tissue capsule



Tumour



Thyroid carcinoma



Types

**Papillary-1
carcinoma**

60% of the malignant thyroid tumours

**Follicular-2
carcinoma**

15% of the malignant thyroid tumours

**3-Medullary
carcinoma**

5% of the malignant thyroid tumours

**4-
Anaplastic
carcinoma**



Thyroid carcinoma



Age:

- ❑ Papillary , follicular and anaplastic carcinomas are more common in **females**
- ❑ Most tumors arise in elderly above the age of 50 years
BUT papillary carcinoma may also arise in children and young adults

before the age of 20 **Predisposing factors:**

1. Ionizing radiation
2. Thyroid adenoma

Gross:

- ❑ **Irregular** firm infiltrating mass
- ❑ A **circumscribed** nodule or multi centeric nodules
- ❑ Follicular carcinoma is capsulated.
- ❑ Areas of hemorrhage , necrosis , cystic changes and calcifications may occur

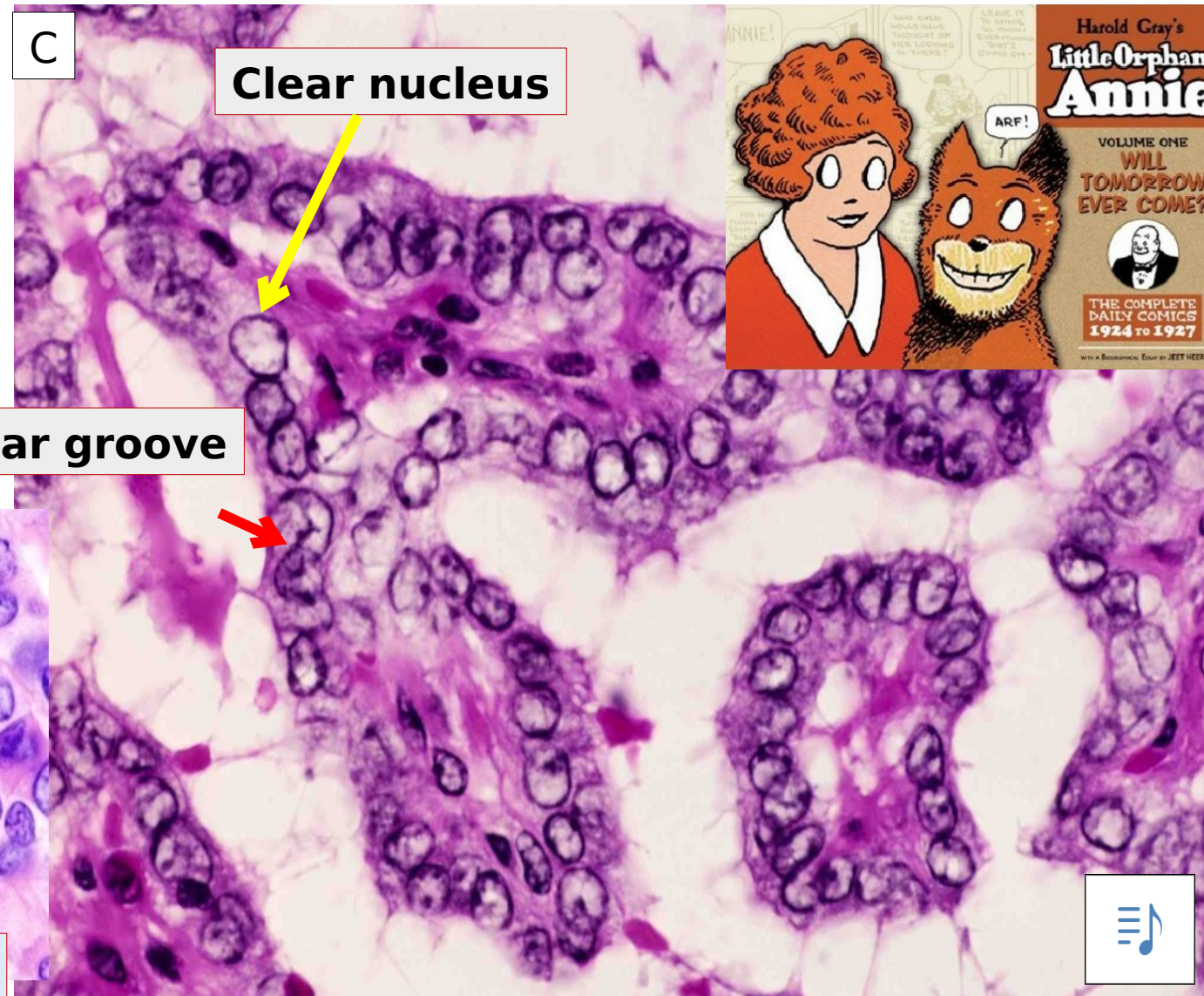
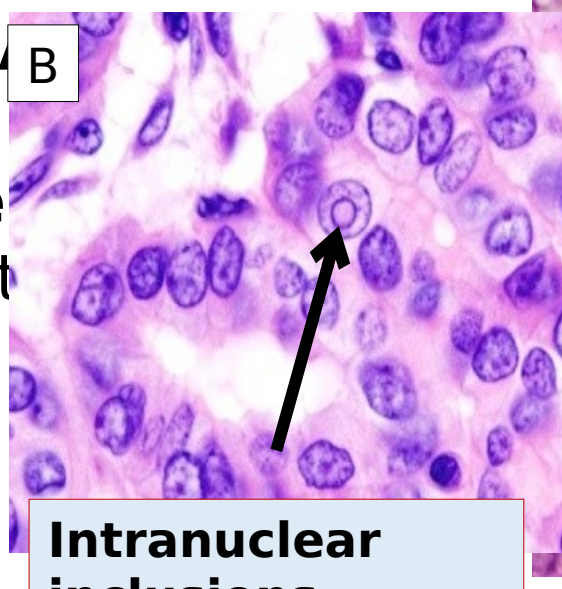
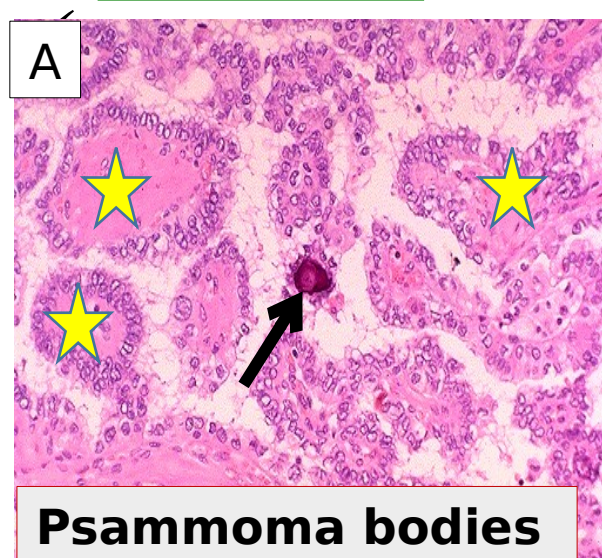


Papillary carcinoma-1



Mic:

- ❑ The tumor exhibits a **papillary pattern**.
- ❑ **Psammoma bodies** may be seen.
- ❑ Characteristic **nuclear features** include



Papillary carcinoma-1



Prognosis:

It has the best prognosis



due to

- ☐ Slow growth
- ☐ Metastasis to the regional cervical lymph nodes.
- ☐ Blood spread is rare or very late

Spread: Lymphatic spread to cervical nodes is common **(the main route)**
Blood spread is rare or very late

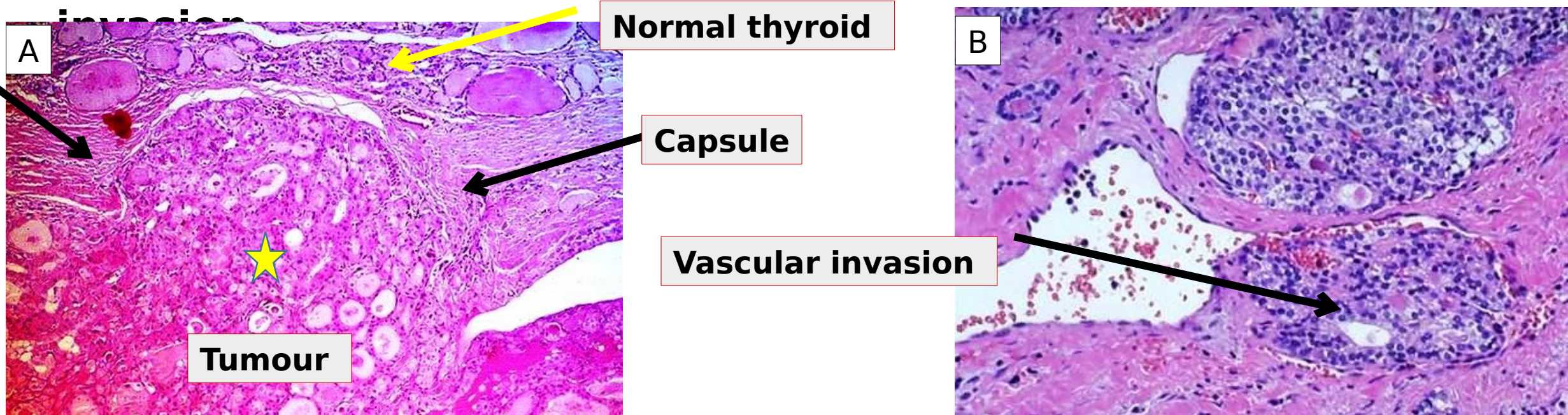


Follicular carcinoma-2



Mic:

- ❑ Resemble follicular adenoma.
- ❑ Diagnosis of malignancy depends on **capsular and or vascular invasion**



Prognosis: Poor due to early blood spread

Spread: Blood spread to the bones or lungs is common.



Medullary carcinoma-3



Origin :

❑ It arises from Parafollicular cells C cells

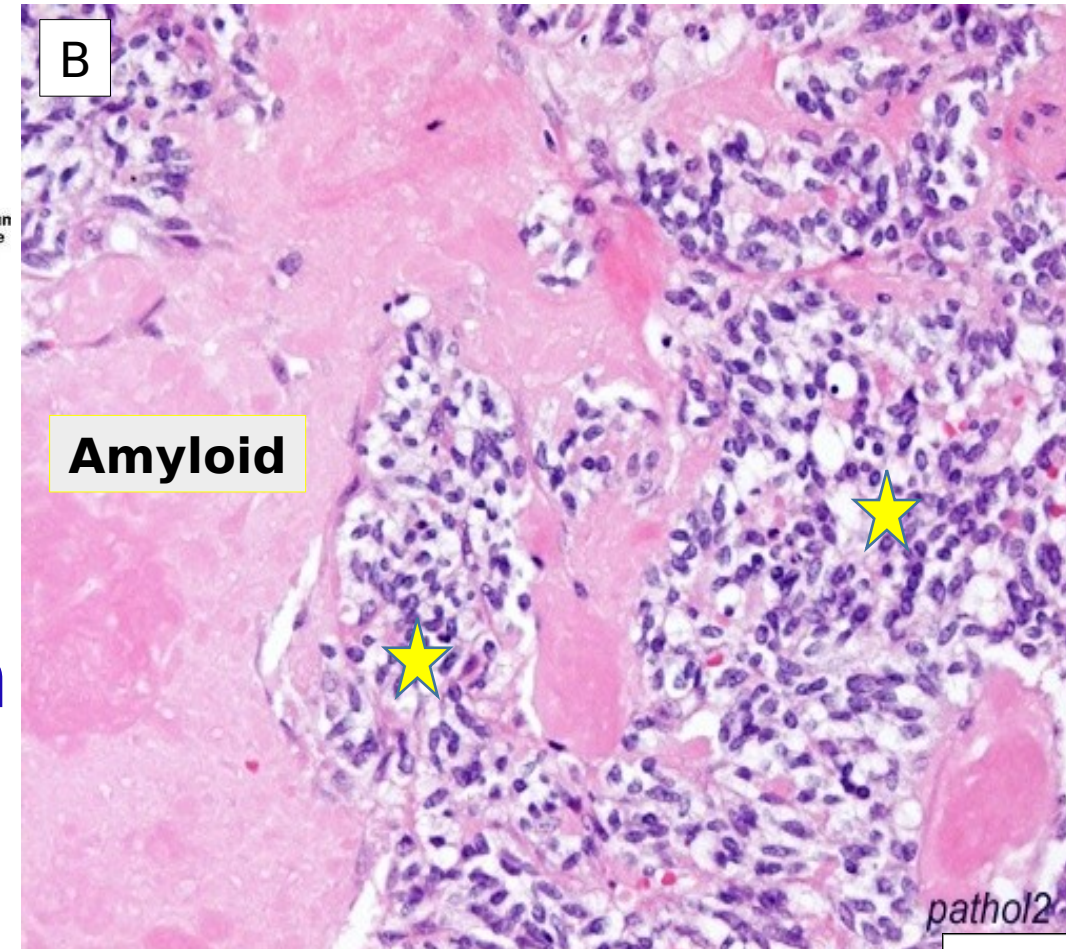
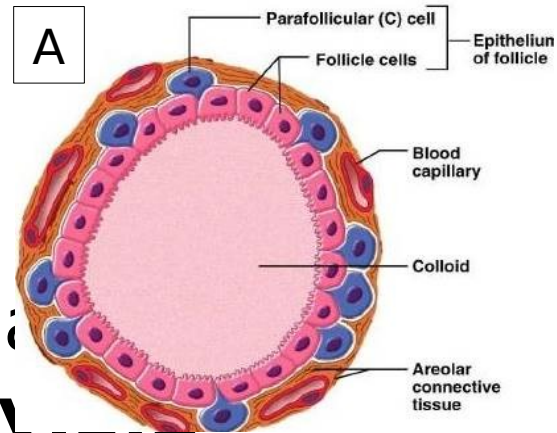
Mic:

Malignant cells are separated by a stroma containing amyloid.

3 : The tumour secretes **calcitonin**

Prognosis:

better than follicular carcinoma



Anaplastic carcinoma-4



Mic:

- ❑ Undifferentiated, anaplastic, pleomorphic cells.

Prognosis:

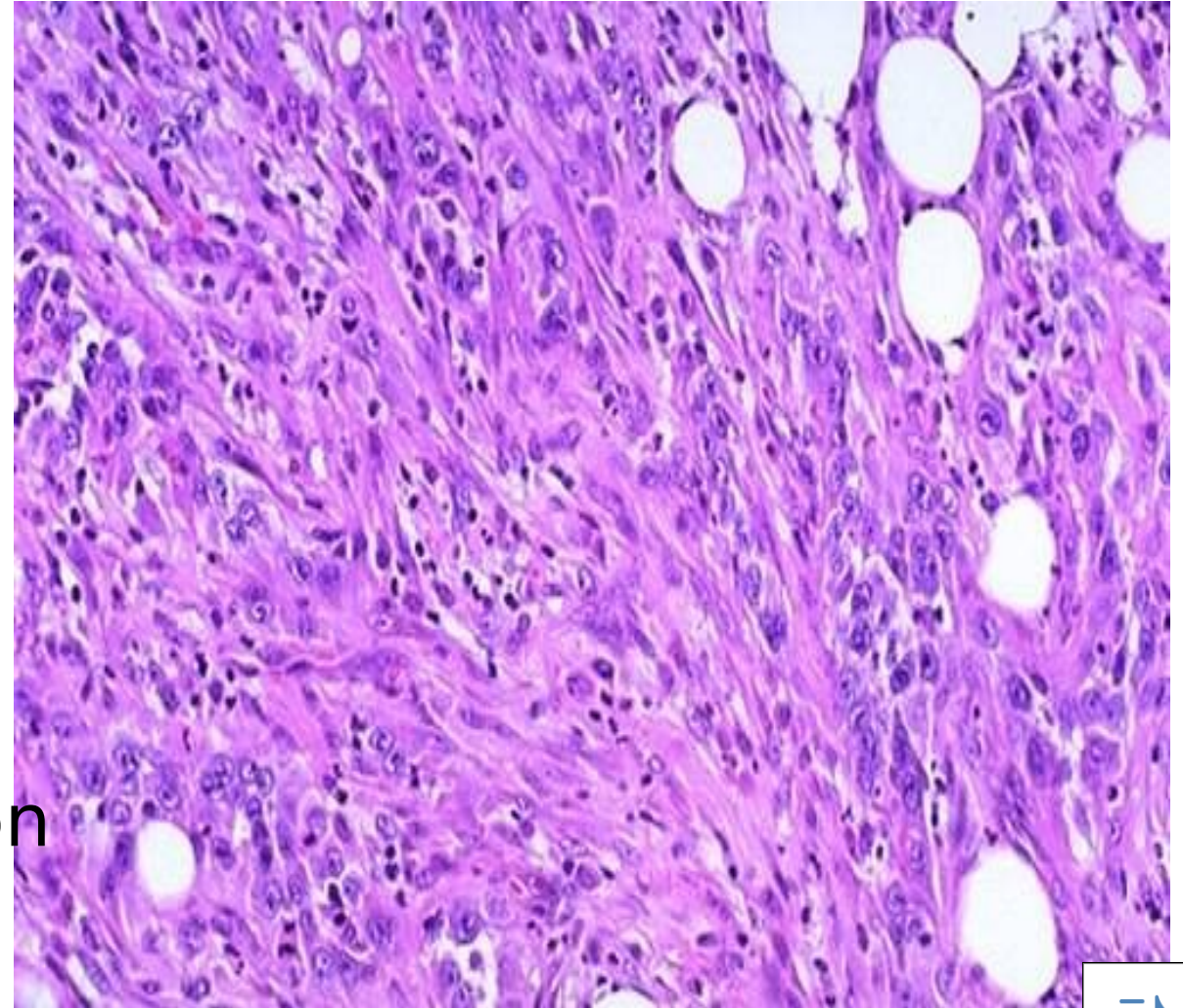
**Very aggressive,
rapidly fatal**

GIVE REASO



due to

Its tendency for early
widespread metastasis & invasion
of the trachea and esophagus



Quiz



Which of the following is Not True regarding Hashimoto thyroiditis?

- a) Stony hard in consistency
- b) Microscopically shows Hurthle cells
- c) May be of autoimmune aetiology
- d) May be complicated by Non Hodgkin B cell lymphoma

Which of the following is True regarding a female patient with exophthalmos, weight loss and palpitations ?

- e) High TSH
- f) Low T3 and T4
- g) Follicles with decreased colloid content microscopically
- h) Multinodular gross cut section



Quiz



thyroiditis ?

- a) Stony hard in consistency**
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Which of the following is True regarding a female patient with exophthalmos, weight loss and palpitations ?

- e) High TSH
- f) Low T3 and T4
- g) Follicles with decreased colloid content microscopically**

h) Multinodular gross cut section



Suggested Text book



Robbins basic pathology, tenth Edition





Thank you

